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Phytologia (June 1993) 74(6):421-427.

A NEW SPECIES OF *MELOCACTUS* (CACTACEAE) FROM CENTRAL CUBA

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ABSTRACT

Melocactus perezassoi (Cactaceae) is described as endemic to the exposed cliffs of the northern mountain ranges of Guamuhaya (Escambray) in central Cuba. The new species is related to *Melocactus harlowii* (Britton & Rose) Vaupel from the coastal terraces of southeastern Cuba, but exhibits more separate areoles with a higher number of spines which are less stout, longer flowers with stigmatic lobes not exserted above the stamens, and long, clavate fruits. This endemic and potentially threatened species may benefit from management practices. Comparative illustrations of the new taxon and its nearest relative are provided, and also a key for the Cuban species of *Melocactus*

KEY WORDS: *Melocactus*, Cactaceae, Cuba, West Indies

The *Melocactus* were among the first cacti known in Europe. At first they were called *Echinomelocactus*, but this eventually was shortened to *Melocactus* by Tournefort, and then to *Cactus* by Linnaeus.

When Link & Otto (1827) restored the name *Melocactus*, the genus included only four species, of which three, by modern interpretation, are endemic to the Caribbean (Taylor 1991). The novelty described here represents the third species of *Melocactus* recognized in central Cuba, and the second taxon described in the Villa Clara province within the last two decades.

Melocactus perezassoi Areces, *sp. nov.* (Figure 1). TYPE: CUBA. Prov. Villa Clara: northern ranges of Guamuhaya (Escambray), vicinity of Jibacoa, on an exposed cliff facing the river dam, 22° 01′ 28″ N, 80° 00′ 00″ W, 15 April 1991, *W. Figueredo, E. Sardiñas, & J.A. Sánchez 2366* (HOLOTYPE: MNHN; Isotype: HAC).

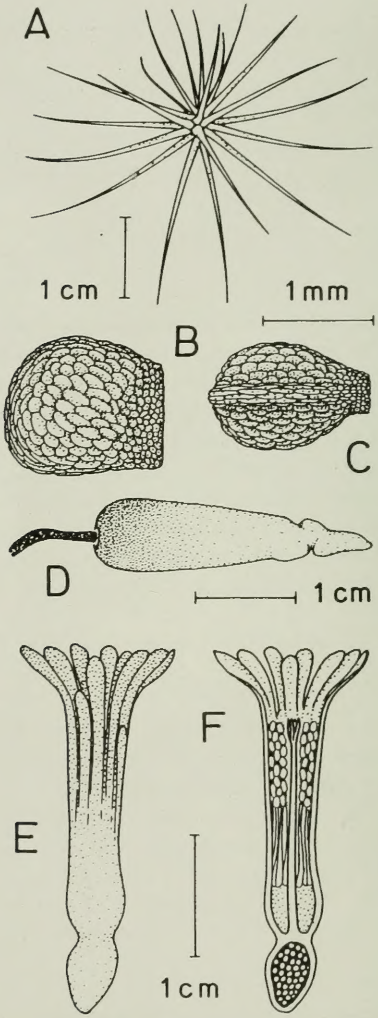

Figure 1. *Melocactus perezassoi*. A. Typical areole with 16 radial spines and 4 centrals. B. Seed, lateral view. C. Seed, dorsal view. D. Flower. E. Flower, sectioned, showing stamens, nectar chamber, style with the stigma lobes not exserted above the stamens, and ovary. F. Fruit. All figures from the type specimen.

Caulis subglobosus vel ovoideus 11.0-16.5 cm alt. et 10.5-15.0 cm diam.; costis 12-13 verticalibus, crenatis ad areolas impressis; areolis 9-15 mm instructis, spinis 17-24, 0.5-3.0 cm longis, flavidis usque pallide ochraceis; cephalio 6.8-8.3 cm diam., semigloboso vel cylindrico-elongato usque 12-14 cm alt., griseo-albido, apicem versus cremeo, pilis salmoneis vel pallide croceis usque rufis intermixtis; floribus dilute roseis 2.8-3.4 cm longis et 1.2-1.5 cm diam., cephalio inmersis apice tantum 6-8 mm superantibus, segmentis linearibus ad apicem late rotundatis, 4-7 mm longis, stigmate inserto apicem antherarum vix attingenti; fructibus clavatis superne pallide roseis 2.2-2.8 cm longis.

Stem subglobose to ovoid (11.0-)12.0-14.0(-16.5) cm tall to the base of cephalium and (10.5-)11.0-13.5(-15.0) cm in diameter, light to yellowish-green, simple or sometimes ramified on top of old individuals; ribs 12-13 vertical, with an acute edge between the areoles, 22-30 mm high and 18-26 mm broad near widest part of stem, 9-16 mm high and 13-21 mm broad at the base of cephalium; areoles longitudinally elliptic to oblong-elliptic, 6-8 mm long and 4-6 mm broad, 9-15 mm apart on the ribs, 9-15 visible per rib in lateral view, sunken into notches 2-4 mm deep. Spines 17-24, 0.5-3.0 cm long, rather slender, terete, pale yellow changing to horn-color or a little verging to brown with age, scarcely overlapping those from areoles on adjacent ribs; radial spines 14-19, slightly curved upwards, 0.5-2.5 cm long and 0.4-0.8 mm in diameter, upper 1-4 often short and slender, lowermost 1-5 largest, remainder graded in size; centrals 3-5, commonly 2-3 cm long, to 0.7-0.9 mm in diameter, spreading, somewhat upcurved or straight. Cephalium hemispherical to cylindric-elongated, more than half as broad as the vegetative stem, 6.8-8.3 cm in diameter and commonly 4-9 cm tall, occasionally 12-14 cm tall, composed of dense wool and clusters of fine bristles spaced 2-4 mm, bristles 23-30 mm long, exserted 3-7 mm, salmon colored to pale orange-red or brownish-red, wool at apex cream, later greyish-white. Flowers pale pink, 2.8-3.4 cm long, 1.2-1.5 cm wide, exserted to 6-8 mm above cephalium surface, opening at 3 p.m. and closing after 6:30 p.m.; pericarpel 6-7 mm long and 3.5-4.0 mm broad; nectar-chamber 3.2-3.9 mm long and 3.0-3.5 mm wide, remainder of tube 9.1-10.3 mm long and 4.3-5.2 mm in diameter; perianth segments 21-29, 15-22 visible from above, expanding fully at an angle of 40-50°, linear, broadly rounded at tip, the outer series scarcely longer than the inner segments, 4-7 mm long and 1.2-2.0 mm wide; anthers oblong, forming a girdle 6.5-7.5 mm high around the style and stigma; style straight, white, including the stigma to 15.0-16.5 mm long, stigma lobes 7, whitish, subulate, 2.0-2.5 mm long, not exserted above the stamens. Fruits faintly to pale pink at apex, fading to pure white below middle or at base, clavate, terete, the base frequently folded into 2-3 pleats widthwise, 2.3-2.8 cm long and 6-8 mm broad, with a 15-18 mm long withered floral remain on top. Seeds commonly 19-23 per fruit, nearly globose, 1.3-1.4 mm long and 1.1-1.3 mm wide, black, smooth, with scarcely convex, somewhat elongated testa-cells on sides, more elongated and narrowed at periphery, and much more reduced in size, isodiametric, and not raised at the hilum end.

ETYMOLOGY: *Melocactus perezassoi* is named in honor of A. Pérez Asso of the Museo Nacional de Historia Natural, the first Cuban naturalist to collect the species, in the early 1980's.

DISTRIBUTION: Known only from the type locality.

In general aspect, as well as in certain details of the cephalium, *Melocactus perezassoi* is similar to *M. harlowii* (Britton & Rose) Vaupel and is no doubt a close relative. However, it can be readily distinguished from the latter by its areoles, more separated and with a greater number of spines, which are a little less stout and pale yellow (not reddish) when young; the outstanding vertical growth of its cephalium, and its larger flowers with linear perianth segments broadly rounded at tip; and a shorter style with the stigma not exserted above the upper stamens. The new taxon can also be differentiated from *M. harlowii* by its long clavate (not obovoid) fruits, faintly to pale pink (not red) at apex, and its bigger seeds (Figure 2). It will perhaps be useful to distinguish *M. perezassoi* from this and all Cuban species of *Melocactus* which I recognize by contrasting some important diagnostic characters in key form:

1. Ribs 8-9; fully open flowers 5-7 mm diam.; fruit to 1.5 cm long.
    2. Stem less than 10 cm diam.; spines 7-9 per areole, centrals 1. .... *M. matanzanus* León
    2. Stem more than 10 cm diam.; spines 5-6 per areole, centrals lacking. .... *M. actinacanthus* Areces
1. Ribs 10-13; fully open flowers more than 7 mm diam.; fruit length exceeding 1.5 cm.
    3. Stem simple, not ramified; central spines 1-2, clearly distinguishable from radials.
        4. Stem globose-depressed; central spines straight, exceeding 3 cm long. .... *M. guitartii* León
        4. Stem ovoid to subconical, not depressed; central spines somewhat inflexed, 3 cm long at most. .... *M. holguinensis* Areces
    3. Stem of old specimens often ramified; central spines 2-4, hardly distinguishable from radials.
        5. Spines very stout, the central ones exceeding 4 cm in length, and more than 3 mm thick at base. .... *M. acunai* León

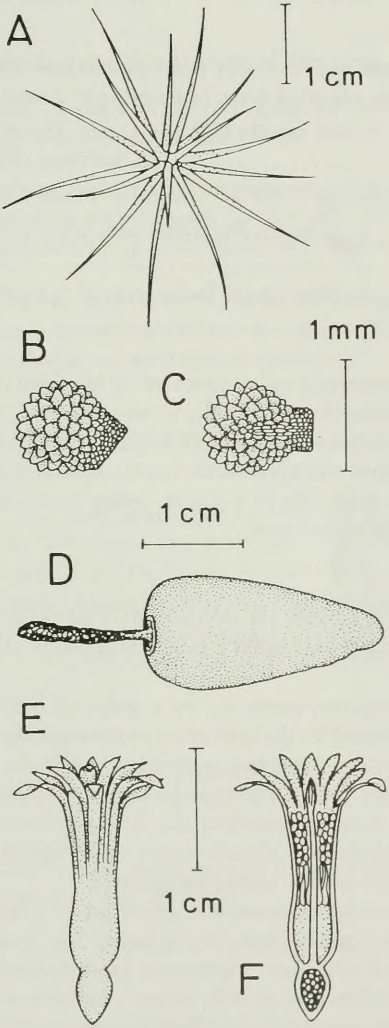

Figure 2. *Melocactus harlowii.* A. Areole with 12 radial spines. B. Seed, lateral view. C. Seed, dorsal view. D. Flower. E. Flower, sectioned, showing stamens, nectar chamber, style with the stigma exserted above the stamens, and ovary. F. Fruit. A from a photograph taken by the author at Tortuguilla, prov. Guantanamo. D, E from specimens growing at Cuevas del Turquino, prov. Santiago de Cuba (*Areces 3013* [MNHN spirit collection]. B, C, F from a cultivated plant collected at Uvero, prov. Santiago de Cuba (*Areces 3002* [MNHN spirit collection].

5. Spines not markedly stout (sometimes thin and weak), none of them reaching 4 cm in length nor 3 mm thick.
    6. Spines mostly 9-16 per areole, about 1 mm thick at base. . . .. *M. harlowii* (Britton & Rose) Vaupel
    6. Spines 17-24 per areole, less than 1 mm thick at base.
        7. Ribs 10; fruits obovate, 1.4-2.1 cm long. .... *M. radoczii* Mészáros
        7. Ribs 12-13; fruits clavate, 2.3-2.8 cm long. .... *M. perezassoi* Areces

Melocactus perezassoi is only separated 30 km from its closest geographical ally, *M. actinacanthus* Areces (1976), a very different, unrelated, serpentine-dweller in the *M. matanzanus* León (1934) group. Paradoxically, *M. harlowii*, its near relative from the systematic standpoint, is a geographically remote species within the main island of Cuba, being more than 400 km separated from the novelty described here.

CURRENT STATUS OF *MELOCACTUS PEREZASSOI* AND MANAGEMENT RECOMMENDATIONS

Melocactus perezassoi seems to be a relict of drier climates on ancient coastal areas conformed by the marine transgressions that made an archipelago of what was to become later the main island of Cuba. Now, it is restricted to the exposed rocky cliff at the type locality at Jibacoa. In 1992, I searched for the species in areas surrounding the Jibacoa River valley and discovered no additional populations, a situation very much like the one exhibited by *M. actinacanthus*, which is now highly endangered.

Although *Melocactus perezassoi* is protected to a certain extent by the inaccessibility of its location, the risk of losing the small population to such threats as a natural landslide, wildfire, or by disturbances due to human activity, should be taken into consideration. Extraction of ancient bat guano for fertilizer from a cave on the cliff has caused some destruction in adjacent areas. The collecting practices of some intrepid gatherers are also clearing up portions of the cliff formerly occupied by the plants. Despite its relative inaccessibility, the population may not be secure enough to ensure survival of the species.

Recognizing the new taxon and current status of its only known population, it seems expedient to formulate sound management plans for protection. I suggest:

1.) restricting or prohibiting access of unauthorized persons to the cliff;

2.) protecting the habitat from disturbances of any kind;

3.) studying the potential effect of natural disasters (wildfire, falling rocks, diseases, etc.) and ways to reduce risks; and

4.) initiating artificial and natural regeneration experiments to test the feasibility of repopulating certain areas on the cliff and, eventually, of establishing new populations in other areas with appropriate habitat.

The range of *Melocactus perezassoi* is restricted enough to merit protection under Cuban environmental legislation; its vulnerability should justify a petition for national listing as an endangered species.

ACKNOWLEDGMENTS

The present study has been made possible by the facilities provided by the *Jardin Botánico de Cienfuegos* and gratitude is hereby expressed to the management of this institution. Particular mention is to be made of Arabel Cuesta, Resident Principal, whose cooperative spirit and enthusiasm are well known to every visitor. Appreciation extends to Wilfredo Figueredo, former member of the *J.B.C.* staff, who took the lead in the *Melocactus* collecting expedition of April, 1991.

LITERATURE CITED

Areces-Mallea, A.E. 1976. Una nueva especie de *Melocactus* Link et Otto de Cuba. Revista Ciencias, Ser. 10 9:3-11.

León, Bro. 1934. El género *Melocactus* en Cuba. Memorias de la Sociedad Cubana de Historia Natural 7:201-208.

Taylor, N.P. 1991. The genus *Melocactus* (Cactaceae) in Central and South America. Bradleya 9:1-80.

Phytologia (June 1993) 74(6):428-430.

NEW COMBINATIONS IN *MEZOBROMELIA* AND *RACINAEA* (BROMELIACEAE: TILLANDSIOIDEAE)

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ABSTRACT

New combinations are made in *Mezobromelia* L.B. Smith for three species previously attributed to *Vriesea*: **Mezobromelia capituligera** (Grisebach) J.R. Grant, **M. hospitalis** (L.B. Smith) J.R. Grant, and **M. magdalenae** (L.B. Smith) J.R. Grant. In addition to the 46 species attributed to *Racinaea* by Spencer & Smith (1993), five more are here added. These new combinations include: **Racinaea almeriae** (Rauh) J.R. Grant, **R. domingosmartinis** (Rauh) J.R. Grant, **R. hauggiae** (Rauh) J.R. Grant, **R. nervibractea** (Gilmartin & Luther) J.R. Grant, and **R. pseudotetrantha** (Gilmartin & Luther) J.R. Grant.

KEY WORDS: Bromeliaceae, Tillandsioideae, *Mezobromelia*, *Vriesea*, *Racinaea*, *Tillandsia*

Revisionary studies undertaken to define the taxonomic limits of the genera of the Tillandsioideae have revealed the need for a number of transfers. Three species previously attributed to *Vriesea* are here transferred to *Mezobromelia* due to their appendaged and partially agglutinated petals.

Mezobromelia capituligera (Grisebach) J.R. Grant, *comb. nov.* BASIONYM: *Tillandsia capituligera* Grisebach, *Cat. Pl. Cub.* 254. 1866. *Vriesea capituligera* (Grisebach) L.B. Smith & Pittendrigh, J. Wash. Acad. Sci. 43:402. 1953. TYPE: CUBA. eastern part, *Wright 3275* (HOLOTYPE: GOET, photo US; Isotype: GH).

Mezobromelia hospitalis (L.B. Smith) J.R. Grant, *comb. nov.* BASIONYM: *Tillandsia hospitalis* L.B. Smith, Caldasia 5:13. 1948. *Vriesea hospitalis* (L.B. Smith) L.B. Smith, Phytologia 5:397. 1956. TYPE: COLOMBIA. Magdalena: Hacienda Cincinnati, mountains of Santa Marta, 3 Aug 1946, *Foster & Smith 1403* (HOLOTYPE: GH).

Mezobromelia magdalenae (L.B. Smith) J.R. Grant, *comb. nov.* BASIONYM: *Vriesea magdalenae* L.B. Smith, Phytologia 8:500. 1963. TYPE: COLOMBIA. Magdalena: near Cebolleta, 1 Feb 1959, *Castañeda 7199* (HOLOTYPE: US).

Spencer & Smith (1993) suggested that three Rauh species probably belonged to *Racinaea*, but were unable to place them. Based on the presence of distichously arranged flowers, and obovate, asymmetric sepals, I have concluded that these three species as well as two Gilmartin & Luther species belong to *Racinaea*.

Racinaea almeriae (Rauh) J.R. Grant, *comb. nov.* BASIONYM: *Tillandsia almeriae* Rauh, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 58:19. 1986. TYPE: COLOMBIA. Between Ibaque and Almeria, *Rauh 37152a* (HOLOTYPE: HEID).

Racinaea domingosmartinis (Rauh) J.R. Grant, *comb. nov.* BASIONYM: *Tillandsia domingosmartinis* Rauh, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 79:17. 1991. TYPE: BRAZIL. Espírito Santo: Domingos Martins, *Rauh 67614* (HOLOTYPE: HB).

Racinaea hauggiae (Rauh) J.R. Grant, *comb. nov.* BASIONYM: *Tillandsia hauggiae* Rauh, Abh. Akad. Wiss. Lit. Mainz, Math.-Naturwiss. Klasse, Trop. Subtrop. Pflanzenwelt 52:46. 1985. TYPE: ECUADOR. Azuay: Cuenca-Giron, *Haugg & Ehlers E. 109* (HOLOTYPE: HEID).

Racinaea nervibractea (Gilmartin & Luther) J.R. Grant, *comb. nov.* BASIONYM: *Tillandsia nervibractea* Gilmartin & Luther, J. Brom. Soc. 40(6):250. 1990. TYPE: ECUADOR. Without locality, flowered in cultivation at the Brooklyn Botanic Garden, *Kalmbacher s.n.* (HOLOTYPE: US).

Racinaea pseudotetrantha (Gilmartin & Luther) J.R. Grant, *comb. nov.* BASIONYM: *Tillandsia pseudotetrantha* Gilmartin & Luther, J. Brom. Soc. 40(6):250. 1990. TYPE: ECUADOR. El Oro, 11 km W of Pinas, road to Sta. Rosa ("new road"), *Dodson, Gentry, & Shupp 9075* (HOLOTYPE: SEL).

ACKNOWLEDGMENTS

I thank James R. Rundell, Lyman B. Smith, and Michael A. Spencer for comments on and review of the manuscript.

LITERATURE CITED

Spencer, M.A. & L.B. Smith. 1993. *Racinaea*, a new genus of Bromeliaceae (Tillandsioideae). Phytologia 74(2):151-160.

Phytologia (June 1993) 74(6):431-437.

FLORISTICS OF TWO LOUISIANA SANDSTONE GLADES

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ABSTRACT

The floristics and edaphic conditions of two west Louisiana sandstone glades are described.

KEY WORDS: Sandstone glade, Kisatchie National Forest, floristics, Louisiana

INTRODUCTION

In a previous paper we have described the floristics, species richness, geology, and edaphic conditions of one sandstone glade (Flat Glade) in the Kisatchie Ranger District of the Kisatchie National Forest in western Louisiana (MacRoberts & MacRoberts 1992). Since each glade is unique, we wished to study several to get an overall sample of the range of variation in plant species found in them. For this study we chose two glades in the Kisatchie Ranger District that, because of previous surveys, we had reason to believe bracketed Flat Glade. One had less ground cover, the other had more. One had more exposed rock, the other had less. We describe here their floristics and edaphic conditions.

Increased familiarity with the literature on the floristics of sandstone glades in the eastern United States has reinforced our initial impression that while there is substantial information on this habitat for the east central United States, there are few descriptions of glade communities in the West Gulf Coastal Plain (see DeSelm 1986; Perkins 1981; Baskin & Baskin 1989, and references therein).

STUDY SITES AND METHODS

Turpentine Glade is located about 18 km SW of Cloutierville, Louisiana, in T6N R7W S34; X Glade is about 18 km WSW of Cloutierville in T6N R7W S17. They are about 5 km apart and about 7.5 km SW and W of Flat Glade, respectively. They are approximately 80 meters above sea level and each measures about 1.2 ha. Neither has been burned for several years, and although their specific fire histories are unknown, since they are embedded in the pyrogenic longleaf pine community they undoubtedly burned regularly in the past (Smith 1991; Martin & Smith 1991). Both occur on Catahoula sandstone embedded in Kisatchie clay (Martin *et al.* 1990; MacRoberts & MacRoberts 1992).

X Glade is severely eroded in places, with little or no soil on exposed rock or in washed out gullies. Over most of its surface, vegetative ground cover is discontinuous. Turpentine Glade is characterized by a continuous herbaceous cover with little recent erosion and only small areas of exposed ground or rock surface. Neither site has extensive "flat-rock" or sandstone "pavements," which characterize some glades in the Kisatchie National Forest and in other parts of the southeast and east (Perkins 1981).

Climatic data are given in Martin *et al.* (1990) and MacRoberts & MacRoberts (1992). Annual precipitation averages about 125 cm. The year of the study, 1992, was cooler than average, with summer temperatures seldom rising above 35 ° C.

We visited both glades every two weeks between March and November 1992 to identify all vascular plant species occurring at each site. At both, the entire glade was surveyed. Although both sites were rich in lichens (e.g., *Cladonia* spp.) and mosses, we did not attempt to identify these. We follow MacRoberts (1989) and Gandhi & Thomas (1989) for botanical nomenclature.

We ran a transect 137 meters long and 3 meters wide through the longest part of each glade. Within the transect we counted the number of trees over 1.5 m tall and measured their dbh. Soil samples were taken as in our previous study and analyzed by A & L Analytical Laboratories, Memphis, Tennessee.

We cursorily explored other sandstone glades (and similar open habitat) in the Kisatchie National Forest, and in the Angelina National Forest, Texas, about 120 km southwest of our study sites in Louisiana.

RESULTS

X Glade is a mesa-like outcrop rising in a single tier of about 7 meters above the surrounding upland longleaf pine forest. Turpentine Glade consists of a small butte about 7 meters high surrounded by a talus slope. The transition between glade and surrounding longleaf pine forest is not abrupt at either site.

Table 1. Soil characteristics.

		Exchangeable ions (ppm)				
Sample	pH	P	K	Ca	Mg	OM%
X Glade	4.6	6	53	480	248	1.6
Turp. Glade	5.1	5	20	270	53	1.5

Both glades are open with widely scattered stunted and gnarled trees. At Turpentine Glade there were eight *Pinus palustris* P. Mill. in the 411 square meter transect ranging from 3 to 32 cm dbh, with a mean of 10.9 cm. This translates to one tree per 51 square meters and a canopy cover of about 10%. X Glade had more trees; in the 411 square meter transect there were 19 (1 *Quercus marilandica* Muenchh., 3 *Pinus echinata* P. Mill., 5 *P. taeda* L., and 10 *P. palustris*), ranging from 3 to 30 cm dbh, with a mean of 9.6 cm. This translates to one tree per 22 square meters. Although X Glade had more trees than Turpentine Glade, these were far more stunted resulting in a similar canopy cover of about 10%.

Flat Glade is intermediate between X Glade and Turpentine Glade in tree size and number, with an average of one tree per 26 square meters and a range of 2.4-38.0 cm dbh, with a mean of 11.32 dbh.

As in Flat Glade, many of the trees in X Glade and Turpentine Glade are old; we cored trees 28-38 cm dbh in Flat Glade and X Glade, and found that they ranged from 120 to 220 years old (MacRoberts & MacRoberts 1993; the upper figure of 380 years given in that paper is an error–the oldest tree we found was about 220 years).

Soil information on Turpentine and X glades is given in Table 1. The soil is acidic and essentially infertile and very similar to that of Flat Glade. Surface geology is resistant beds of Catahoula sandstone overlain with Kisatchie soil (fine montmorillonitic, thermic Typic Hapludalfs) (Martin *et al.* 1990:104).

The taxa found in Turpentine and X glades are listed in Table 2. Double asterisk indicates presence at Turpentine Glade only, single asterisk at X Glade only, and no symbol indicates presence at both glades.

Turpentine Glade had 69 taxa, representing 49 genera, and 25 families. X Glade had 43 taxa, representing 35 genera, and 22 families. Sorensen's Index of Similarity indicates that Turpentine and X glades are vegetationally the same community type (IS = 74). Most frequent species in both glades were rayless goldenrod (*Bigelowia nuttallii* Anderson) and little bluestem (*Schizachyrium scoparium* [Michx.] Nash). The families with the most species were grasses and composites, the two groups together accounting for about a third of the species.

Flat Glade is vegetationally the same community as both X Glade (IS =

Table 2. Taxa present at Turpentine (**) and X (*) glades, or both (no symbol).

CYPERACEAE – *Rhynchospora globularis* (Chapm.) Small, *R. plumosa* Ell.**, *Scleria ciliata* Michx.

IRIDACEAE – *Sisyrinchium sagittiferum* Bickn.**

LILIACEAE – *Aletris aurea* Walt.**, *Aletris farinosa* L.**, *Allium canadense* L.**, *Smilax glauca* Walt.

ORCHIDACEAE – *Platanthera nivea* (Nutt.) Luer**, *Spiranthes tuberosa* Raf.**, *S. vernalis* Engelm. & Gray.

PINACEAE – *Pinus echinata* P. Mill., *P. palustris* P. Mill., *P. taeda* L.

POACEAE – *Andropogon ternarius* Michx., *Aristida virgata* Trin., *Dicanthelium aciculare* (Desv. *ex* Poir.) Gould & Clark, *D. sphaerocarpon* (Ell.) Gould, *Muhlenbergia expansa* (Poir.) Trin.**, *Panicum virgatum* L.**, *Schizachyrium scoparium* (Michx.) Nash, *Schizachyrium tenerum* Nees**, *Sporobolus junceus* (Michx.) Kunth**.

APIACEAE – *Eryngium yuccifolium* Michx.**

ASCLEPIADACEAE – *Asclepias longifolia* Michx., *A. obovata* Ell.

ASTERACEAE – *Aster dumosus* L., *A. linariifolius* L., *A. paludosus* Dryand. *ex* Ait. ssp. *hemisphericus* (Alex.) Cronq., *A. sericeus* Vent. var. *microphyllus* DC.**, *Bigelowia nuttallii* Anderson, *Eupatorium rotundifolium* L.**, *Helianthus angustifolius* L., *Heterotheca graminifolia* (Michx). Shinners, *Hieraceum gronovii* L.**, *Liatris earlei* (E. Greene) K. Schun.**, *L. pycnostachya* Michx.,**, *L. squarrosa* (L.) Michx., *Senecio tomentosus* Michx., *Silphium laciniatum* L.**, *Solidago nitida* Torrey & Gray**, *Vernonia texana* (A. Gray) Small.**

AQUIFOLIACEAE – *Ilex opaca* Ait., *I. vomitoria* Ait.

CLUSIACEAE – *Hypericum hypericoides* (L.) Crantz.

DROSERACEAE – *Drosera brevifolia* Pursh.

ERICACEAE – *Vaccinium arboreum* Marsh, *V. corymbosum* L., *V. stamineum* L.**

EUPHORBIACEAE – *Euphorbia corollata* L.

Table 2. (continued).

FABACEAE – *Baptisia leucophaea* Nutt.**, *Schrankia microphylla* (Dry.) J.F. Macbr.**, *Stylosanthes biflora* (L.) B.S.P., *Tephrosia onobrychoides* Nutt.**, *T. virginiana* (L.) Pers.

FAGACEAE – *Quercus falcata* Michx., *Q. marilandica* Muenchh., *Q. stellata* Wang.

GENTIANACEAE – *Sabatia gentianoides* Ell.**

HAMAMELIDACEAE – *Liquidambar styraciflua* L.*

LINACEAE – *Linum medium* (Planch). Britt.

LOGANIACEAE – *Gelsimium sempervirens* (L.) St. Hill.

MYRICACEAE – *Myrica cerifera* L.

NYSSACEAE – *Nyssa sylvatica* Marsh.

POLYGALACEAE – *Polygala incarnata* L.**, *P. mariana* P. Mill.**, *P. nana* (Michx.) DC.

RUBIACEAE – *Hedyotis nigricans* (Lam.) Fosberg**.

SCROPHULARIACEAE – *Agalinis* sp., *Aureolaria pectinata* (Nutt.) Penn.*

VIOLACEAE – *Viola pedata* L.

72) and Turpentine Glade (IS = 79).

Turpentine Glade is floristically richer than X Glade, a difference due largely if not entirely to the edaphic differences between the glades. Turpentine Glade has an almost continuous herbaceous cover with stable and, in some places, fairly deep soil as evidenced by areas of erosion; whereas X Glade has little stable soil and much exposed rock.

Flat Glade is intermediate between X and Turpentine glades in degree of barrenness – it is more eroded than Turpentine Glade but less eroded than X Glade. It has much more exposed rock than Turpentine Glade, but much less than X Glade. It is intermediate in species richness, with 63 taxa.

DISCUSSION/SUMMARY

Similar glade habitat (variously described as barrens or prairie-like) occurs in east Texas. On September 18 and again on November 20 and 21, 1992, we visited some of these sites on the Angelina National Forest. While they looked very similar to our glades in surface geology and openness, vegetationally they are quite different. What data has been published (which is not exactly comparable to ours since it was not comparably collected) indicates that the Index of Similarity is only about 35 between the glades we have studied in Louisiana and those areas we examined in Texas (Marietta & Nixon 1984; Orzell 1990:228-232). The reasons for these differences are yet to be understood.

As yet we have little information on the large exposed sandstone "flat rock" or "pavement" glades that occur in the Kisatchie National Forest, but what is available indicates that they may be different enough edaphically and floristically from the communities we have been studying under the generic term "glade" to be classified as distinct communities. They appear to have not only less acidic soil (where there is soil) but to have some plants unique to them, such as *Talinum* and *Selaginella.*

During the 1993 field season we hope to study the east Texas glades/barrens/prairies and the sandstone flatrock glade communities in western Louisiana to resolve some of these problems: specifically to determine whether or not we are dealing with one community, variations of one community, or with two or more communities.

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The continuing cooperation and assistance of the staff of the Kisatchie National Forest have been instrumental in making this study, as in all our botanical research, possible. Rob Evans, Texas National Forests and Grasslands, showed us glades/barrens/prairies in the Angelina National Forest, Texas. Nelwyn McInnis and Latimore Smith, The Nature Conservancy and Louisiana Natural Heritage Program, and D.T. MacRoberts provided many useful comments on an earlier draft of the paper.

LITERATURE CITED

Baskin, J.M. & C.C. Baskin. 1989. Cedar glade endemics in Tennessee, and a review of their autecology. J. Tenn. Acad. Sci. 64:63-74.

Bridges, E.L. & S.L. Orzell. 1989. Longleaf pine communities of the west gulf coastal plain. Natural Areas Journal 9:246-262.

DeSelm, H.R. 1986. Natural forest openings on uplands in the eastern United States. Pp. 366-375. *In* D.L. Kulhavy & D.N. Conner, eds., *Wilderness and Natural Areas in the Eastern United States. A Management Challenge.* Stephen F. Austin State University, Nacogdoches, Texas.

Gandhi, K.N. & R.D. Thomas. 1989. *Asteraceae of Louisiana.* Sida, Bot. Misc. No. 4. Botanical Research Institute of Texas, Fort Worth, Texas.

MacRoberts, D.T. 1989. *A Documented Checklist and Atlas of the Vascular Flora of Louisiana.* Bull. Museum of Life Sciences, Nos. 7-9. Louisiana State University, Shreveport, Louisiana.

MacRoberts, M.H. & B.R. MacRoberts. 1992. Floristics of a sandstone glade in western Louisiana. Phytologia 72:130-138.

MacRoberts, M.H. & B.R. MacRoberts. 1993. Why don't west Louisiana bogs and glades grow up into forests? Phytologia 74:26-34.

Marietta, K.L. & E.L. Nixon. 1984. Vegetation of an open, prairie-like community in eastern Texas. Texas Journal of Science 36:25-32.

Martin, D.L. & L.M. Smith. 1991. A survey and description of the natural plant communities of the Kisatchie National Forest, Winn and Kisatchie Districts. Unpublished report, Louisiana Natural Heritage Program, Department of Wildlife and Fisheries, Baton Rouge, Louisiana.

Martin, P.G., C.L. Butler, E. Scott, J.E. Lyles, M. Mariano, J. Ragus, P. Mason, & L. Schoelerman. 1990. Soil survey of Nachitoches Parish, Louisiana. United States Department of Agriculture, Soil Conservation Service.

Orzell, S.L. 1990. Texas Natural Heritage Program Inventory of National Forests and Grasslands in Texas. Unpublished report, Texas Natural Heritage Program. Parks & Wildlife Department. Austin, Texas.

Perkins, B.E. 1981. Vegetation of sandstone outcrops of the Cumberland Plateau. M.S. Thesis, University of Tennessee, Knoxville, Tennessee.

Smith, L.M. 1991. Louisiana longleaf, an endangered legacy. Louisiana Conservationist, May/June, 24-27.

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A NEW SPECIES OF *LOPHOSTACHYS* (ACANTHACEAE) FROM HONDURAS

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ABSTRACT

The new species **Lophostachys zunigae** is proposed.

KEY WORDS: Acanthaceae, *Lophostachys*, species nova

Lophostachys zunigae C. Nelson, *sp. nov.* HOLOTYPE: HONDURAS. Atlántida: quebrada del Oro, montaña de Búfalo, 20 km SO de La Ceiba, bosque húmedo tropical, 780-1800 msnm, 3-6 mayo 1989, *Zúniga 453* (TEFH); Isotypes: EAP,MO,US.

Planta herbacea vel suffrutescens foliis praeter costa venisque glabris; inflorescentia pedunculata; exteriora segmenta calycis pubescentia superficiaria et nervisequentia; parva fissura antici segmenti calycis; capsula glabra.

Herbaceous or suffrutescent plant obtusely tetragonous, bullate, essentially glabrous, some new stems with hairs on the sides. Petioles 2.0-5.6 cm long by ca. 1 mm wide, curved and moderately widened at the base or not, the leaf blades lance-elliptic in young ones, ovate to elliptic in old ones, 6.0-15.5 cm long, 2-6 cm wide, acuminate or falcate acuminate, acute at the base, decurrent on the petiole, gradually reducing to a margin, very young leaves with transitory brownish multicellular hairs on the petiole, glabrous on both surfaces with white cystoliths on the upper surface and hairs along the sides of the costa and nerves of the lower surface, the venation brochidodromus with 4-5 main lateral veins, the costa sunken on the upper surface and raised on the lower, the veins slightly raised to flat on the upper surface and raised on the lower, the margins entire. Inflorescence pedunculate, to 10 cm long and 3.5 cm wide, the peduncle subtetragonous, pubescent, to 2 cm long and

2 mm wide, rachis pubescent, bract lanceolate, to 1.5 cm long and 3 mm wide, 5-nerved, acuminate-mucronate, pubescent on surface and veins abaxially, glabrous adaxially, ciliate; bracteoles ca. 1 cm long by 0.5 mm wide at the base, and ca. 0.2 mm at the top, pubescent abaxially, glabrous adaxially, ciliate. Calyx lobes 4, the 2 outer segments to 2.5 cm long and 6.5 mm at the widest point, oblanceolate or subspathulate-oblong, acuminate, the anterior lobe cleft to 2 mm at the apex, 9-nerved, pubescent on surfaces and nerves both abaxially and adaxially, ciliate, the posterior one similar except for the cleavage at the apex, the interior segments to 12 mm long by 1 mm wide, pubescent on both surfaces; corolla and stamens not known; ovary glabrous, 2 mm long by 1 mm wide, style filiform to 25 mm long, stigma glabrous, minutely bifid, subclavate. Capsule somewhat compressed, glabrous, to 13 mm long by 4 mm wide; septum to 11 mm long, glabrous; retinaculum to 2 mm long, broad-based, glabrous; seeds 4, lenticular, 3.5 × 3.0 mm, glabrescent, ciliate.

The epithet for this species honors the collector, Ramón Zúniga, It differs from *Lophostachys guatemalensis* J.D. Sm. by the pedunculate inflorescence, the outer calyx segments pubescent on surface and nerves, the small cleft of the interior calyx segment, and the glabrous capsule.

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NYMPHAEACEAE DE LA PENINSULA DE YUCATAN, MEXICO

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y

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RESUMEN

Se presenta la descripción de la familia Nymphaeaceae para la Península de Yucatán, México (estados de Yucatán, Campeche, y Quintana Roo). Se describe taxonómicamente a *Cabomba palaeformis*, *Nelumbo lutea*, *Nymphaea ampla*, y *Nymphaea jamesoniana* y se presenta información sobre su distribución y ejemplares examinados.

ABSTRACT

A description of the Nymphaeaceae from the Yucatán Peninsula of México (states of Yucatán, Campeche, and Quintana Roo) is presented. A taxonomic description of *Cabomba palaeformis, Nelumbo lutea, Nymphaea ampla*, and *Nymphaea jamesoniana*, information about their distribution, and list of specimens examined are presented.

PALABRAS CLAVE (KEY WORDS): Nymphaeaceae, *Cabomba, Nelumbo, Nymphaea*, plantas acuáticas, Yucatán, Campeche, Quintana Roo, México

INTRODUCCION

Los miembros de la familia Nymphaeaceae Salisb. (incluyendo Cabombaceae Rich. y Nelumbonaceae Dumort.) se caracterizan por ser hierbas acuáticas rizomatosas parcial o totalmente sumergidas, caulescentes o acaulescentes, con vasos laticíferos, espacios aéreos y haces vasculares aislados desprovistos de cambium y vasos, comúnmente con idioblastos. Las hojas opuestas o alternas salen directamente del rizoma, las sumergidas generalmente divididas, las flotantes generalmente enteras, con pecíolos largos, comúnmente peltadas, las nervaduras palmadas, con frecuentes dicotomías o tricotomías, generalmente reticuladas. Las flores son generalmente grandes y llamativas, con largos pedicelos, usualmente solitarias, regulares, hipóginas a períginas o epíginas, cíclicas a espiraladas, trímeras a pentámeras (-7), libres o ligeramente connadas en la base, al igual o al contrario que los pétalos. Pétalos de 3 a muchos, libres o ligeramente connados en la base, usualmente de colores brillantes, ocasionalmente diluyéndose hacia los estambres. Estambres de 3 a muchos, las anteras sésiles o sobre un filamento comúnmente dilatado en la base, enteras o apiculadas. Carpelos de 3 a muchos, apocárpicos o sincárpicos, superior a inferior, con uno a muchos óvulos ortótropos a anátropos adheridos a la pared interna o pendulares de la parte superior del carpelo. El fruto una nuez, vaina o baya, los carpelos maduros indehiscentes, las semillas ariladas o desnudas, lisas o equinadas, albuminosas o exalbuminosas (Adams 1972; Calderón de Rzedowski 1979; Duke 1962; Mason 1957; Wood 1959).

Se considera que la familia Nymphaeaceae tuvo su origen en el oeste del antiguo continente de Gondwana o en Laurasia (Raven & Axelrod 1974). Los primeros registros fósiles de esta familia (*Nymphaea*) son del Cretácico superior (Maestrictiano), *N. alba* y el género *Nelumbo* del Oligoceno y el género *Nuphar* del Plioceno (Müller 1981). La familia Nymphaeaceae está constituída por plantas acuáticas de muy amplia distribución que habitan zonas templadas y tropicales de ambos hemisferios, por lo anterior presenta características muy heterogéneas y está constituída por aproximadamente 75 especies agrupadas en ocho o nueve géneros, incluyendo los géneros considerados dentro de Cabombaceae y Nelumbonaceae. En Norteamérica se encuentran cinco géneros, tres de los cuales, *Cabomba*, *Nelumbo*, y *Nymphaea*, crecen silvestres en la Península de Yucatán (Sosa *et al.* 1985).

Clave para los géneros de la familia Nymphaeaceae presentes en la Península de Yucatán:

1. Hojas pequeñas (diámetro 1.5-3.5 cm), las sumergidas divididas y opuestas, las flotantes peltadas; plantas cubiertas con mucílago; flores pequeñas; perianto compuesto por 6 a 8 segmentos, petaloideo, blanco o ligeramente morado, receptáculo pequeño, 4 a 18 carpelos superiores libres; 3-6 estambres; fruto pequeño, 1-3 semillas. .... *Cabomba*

1. Hojas grandes (largo 10-60 cm), flotantes a emergentes, enteras a sinuado-dentadas; plantas sin mucílago; flores grandes.

    2. Perianto de numerosos segmentos, flores grandes de color amarillo; receptáculo grande, carpelos numerosos uniovulados hundidos individualmente en cavidades en el lado superior, solo los estigmas sobresalen; el receptáculo se agranda fuertemente durante la maduración, los carpelos maduran como nueces; estambres muy numerosos, extrorsos, hipóginos. .... *Nelumbo*

    2. Perianto esparcido ampliamente, compuesto por 4 sépalos y de 12 a 32 pétalos de color blanco; carpelos hundidos en un receptáculo carnoso con forma de taza o hipantio en cuya superficie exterior se insertan los pétalos y estambres, prolongándose hacia arriba como estilos carpelares. .... *Nymphaea*

Cabomba Aublet, *Hist. Pl. Guiane Franç.* 1:321, t. 124. 1775.

Nectris Schreb., *Gen.* 1:237. 1789.

Villarsia Neck., *Elem.* 2:110. 1790.

Plantas herbáceas, acuáticas, sumergidas, caulescentes, y rizomatosas. Tallos delgados y simples. Hojas monomórficas o dimórficas, las sumergidas opuestas o ternadas, pecioladas, láminas divididas 5-9 segmentos dico o tricotómicos, las flotantes frecuentemente ausentes, cuando presentes alternas, peltadas, bifurcadas, lineares a elípticas. Flores pequeñas, blancas o moradas, trímeras, perfectas, cíclicas, generalmente flotantes; sépalos 3; pétalos 3, base ligeramente connada, unguiculados, frecuentemente auriculados; estambres 3-6, filamentos delgados, anteras oblongas; carpelos 1-4, libres, estilos apicales, rectos, estigma capitado. Fruto una cápsula coriácea, indehiscente, semillas 1-3, papilosas (Duke 1962; Lot 1991; Standley & Steyermark 1946).

Este género consta de siete especies distribuídas en las regiones templadas y cálidas del Continente Americano. Sólo se conoce una especie para México (Lot 1991).

Cabomba palaeformis Fassett, Castanea 18:127. 1953.

Hierbas acuáticas, perennes, hermafroditas; tallos cilíndricos, diámetro (0.4-)0.9-1.8 mm. Hojas sumergidas, pecioladas, lámina palmada, lóbulos 5, divididos 2 ó 3 veces tricotómicamente, láminas 1.6-2.4(-3.5) cm de largo; pecíolo 4-13 mm de largo. Flores sobre pedúnculos hasta 3.7 cm de largo; sépalos blanquecinos con manchas de color púrpura en la base, ampliamente lanceolados a oblanceolados, largo 4.4-4.8(-5.0) mm, ancho (1.4-)1.8 mm; pétalos blancos, ocasionalmente con diminutas manchas amarillas, lóbulos lanceolados, 3.0(-4.0) mm de largo, uña 1.1-1.2 mm de largo; filamentos lineares, ensanchados en la base, 2.3-2.5 mm de largo, anteras 0.6-1.0 mm de largo; 1 carpelo, unilocular, pardo oscuro, elipsoide, largo 1.4-2.5 mm, ancho 0.4-1.0 mm, 2 óvulos, estilo 0.7-1.1 mm de largo, recto, persistente en el fruto. Frutos pardo oscuro, elipsoides, rostrados, 3-4 mm de largo; semillas 1 ó 2, pardo oscuro, globosas, largo (1.6-)2.1-2.6 mm, ancho 1.9-2.5 mm, superficie pilosa y estriada, región micropilar mucronada, circular, sin tricomas.

Ejemplares examinados:

Campeche: Colonia Nueva Coahuila (Río Candelaria), *Chan 1131* (MEXU, XAL,YUC); Río Candelaria y Río Pital, *Colmenero s/n* (15/5/1984) (MEXU); Río Candelaria, *Lot & Novelo 874* (MEXU); Chan Laguna, *Lundell 1024* (MO); Palizada, *Matuda 3874* (MEXU); Escárcega, *Matuda 37478* (MEXU); Laguna de Noh, *Menéndez 513* (MEXU); Río Candelaria, *Quero & Grether 2968* (MEXU).

Quintana Roo: km 8 carr. a Tomás Garrido, *Cabrera et al. 4508* (MEXU); Río Hondo (Juan Sarabia), *Calzada et al. 7129* (NO,XAL,YUC); San José de la Montaña, *Chater et al. 92* (MEXU); Río Hondo (Alvaro Obregón), *Lot & Novelo 789* (MEXU); Laguna Pitoro, *Novelo 314* (MEXU).

Nelumbo Adans., *Fam. Pl.* 2:76. 1763.

Hierbas acuáticas, enraizadas, perennes, hermafroditas; tallos estoloníferos, con raíces fibrosas. Hojas dimórficas, flotantes, y emergentes, alternas, pecioladas, orbiculares, peltadas. Flores solitarias sobre largos escapos, amarillas o rosadas; perianto de 14-26 tépalos tepaloides, los externos persistentes; estambres ca. 200, espiralmente insertados, anteras extrorsas, apéndice del conectivo conspícuo, carnoso; carpelos (9-)12-28(-39), libres, inmersos en un receptáculo obcónico, esponjoso y endureciéndose en la madurez, ovario con un estilo corto, óvulo solitario, anátropo, pendular. Fruto parecido a una nuez, embebido en el receptáculo obcónico (Correll & Correll 1975; Lot 1991).

Este género consta de dos especies, una distribuida en el suroeste de los Estados Unidos, Islas del Caribe, y Centroamérica; y la otra, en Australia, China, hacia la India y Persia (Lot 1991; Ward 1977; Wood 1959).

Nelumbo lutea (Willd.) Pers., *Synops. Pl.* 2:92. 1806.

Plantas herbáceas enraizadas, hasta de 2 m de largo. Hojas coriáceas, lámina 40-60 cm de diámetro, margen entero, nervadura palmada, de 20 a 24 nervaduras; pecíolo más o menos cilíndrico, adelgazándose hacia la inserción de la lámina, con espinas unicelulares, frecuentemente de color pardo oscuro.

Flores terminales, emergentes, bisexuales, solitarias; escapo emergente, generalmente más largo que el pecíolo, de forma y consistencia como el pecíolo; tépalos amarillos, los externos ampliamente obovados, largo 2.5-4.0 cm, ancho 1.5-4.5 cm, los internos oblanceolados, largo 6.5-11.0 cm, ancho 2.5-5.3 cm; filamentos 10-12 mm de largo, anteras 13-15 mm de largo, apéndices del conectivo incurvados, 5-9 mm de largo; receptáculo largo 2-3 cm, ancho 1.2-1.5 cm, 12-13 carpelos, ovarios oblongos, largo 6-8 mm, ancho 2.1 mm, estigma discoide. Fruto pardo oscuro, de hipocrateriforme a obcónico, largo 6 cm, ancho 4-8 cm, semillas pardo oscuras, globosas, largo 11-20 mm, ancho 8-10 mm, superficie rugulada, estilo persistente. Dado que sólo se encontró un ejemplar de esta especie colectado en la península, la descripción está basada en Lot (1991).

Ejemplares examinados:

Campeche: Palizada, *Matuda 3833* (MEXU).

Nymphaea L., *Sp. Pl.* 1:510. 1753, *partim emend.* J.E. Smith *in* Sibth. & Smith, *Fl. Graec. Prodr.* 1:360. 1808-9, *nom. cons.*

Castalia Salisb., *Ann. Bot.* 2:71. 1805. *nom. rejic.*

Plantas acuáticas, perennes, hermafroditas; rizoma erecto u horizontal. Hojas flotantes, ocasionalmente emergiendo o sumergidas, con largos pecíolos, glabros o pubescentes, láminas ovadas a orbiculares, margen entero o sinuado-dentado, ápice en forma de huso a agudo, base cordada a sagitada, peltada. Flores en largos pedúnculos, generalmente ascendiendo hasta la superficie del agua o emergiendo, solitarias, perfectas, blancas, azules, rojas o amarillas, antesis diurna o nocturna; sépalos 4 (3 ó 5), libres; pétalos 7-40, libres, dispuestos en varios verticilos, los más internos se convierten en estambres; estambres numerosos (20-700), libres, dispuestos en varios verticilos, filamentos amplios en los externos y estrechos a filiformes en los más internos, anteras biloculares, introrsas, conectivo apendiculado o no; carpelos numerosos (5-47), inmersos en un receptáculo carnoso, unidos o libres lateralmente, el tejido superior formando rayos estigmáticos, con o sin apéndices carpelares, óvulos numerosos, anátropos, péndulos; flores algunas veces abortivas. Fruto una baya esponjosa, dehiscencia irregular; semillas con un arilo en forma de campana, cubierta seminal formada de dos capas, la externa membranosa y la interna esclerosada, endospermo poco abundante, perispermo abundante (Correll & Correll 1975; Duke 1962; Lot 1991).

Es un género de muy amplia distribución, compuesto por 35 a 40 especies. En México se encuentran ocho especies, dos de ellas crecen silvestres en la Península de Yucatán (Lot 1991; Sosa *et al.* 1985). En la península también se encuentra *Nymphaea elegans* Hook., especie con grandes y llamativas flores azules a violeta pálido, la cual es usada como ornamental en diferentes lugares.

Clave para las especies del género *Nymphaea* presentes en la Península de Yucatán:

1. Flores grandes con antesis diurna, blancas; carpelos libres en los bordes; hojas grandes y gruesas, lámina con el margen sinuado-dentado, haz verde y envés púrpura. .... *N. ampla*

1. Flores pequeñas con antesis nocturna, blanco-cremosas; carpelos fusionados en los bordes; hojas pequeñas y delgadas, lámina con el margen entero, haz y envés verde. .... *N. jamesoniana*

Nymphaea ampla (Salisb.) DC., *Syst. Veg.* 2:54. 1821. BASIONYM: *Castalia ampla* Salisb., *Parad. Lond.* 1: [pl. 14]. 1805.

Nymphaea ampla (Salisb.) DC. var. *plumieri* Planch., Ann. Sci. Nat. III. 19:44. 1853.

Nombre común: Lool já, naab, nikte' ja, nukuch naab, sak naab, xikin chaak, flor de agua, flor del sol, hoja de sol.

Hierba enraizada con hojas flotantes; rizoma 2-4 cm de diámetro. Hojas ovadas a suborbiculares, largo 12-36 cm, ancho 11-36 cm, margen sinuado-dentado, dientes frecuentemente irregulares, haz verde, algunas veces con manchas irregulares oscuras y el margen rojo-púrpura, ápice obtuso, base cordada, lóbulos 4.8-11.8 cm de largo; 21-26 nervaduras principales, engrosadas, nervaduras secundarias reticuladas; pecíolo más o menos firme, 3-4 mm de diámetro, glabro o pubescente. Flores emergentes, blancas, antesis diurna, pedúnculo de 3-6 mm de diámetro, generalmente más grueso que el pecíolo, glabro o pubescente, algunas veces con los márgenes alados; sépalos verdes con líneas oscuras en la superficie externa, lanceolados, largo 4.3-8.8 cm, ancho 1.2-1.9(2.4) mm, ápice agudo; pétalos blancos, ocasionalmente con líneas violáceas, estrechamente elipsoides a elipsoides, largo 4.8-9.2 cm, ancho 1.1-1.6 mm, ápice agudo a obtuso; estambres externos con filamentos lanceolados a elipsoides, petaloides, 8.0-14.2 mm de largo, anteras 14-17 mm de largo, apéndices del conectivo linguiformes, (5-)6-8(-13) mm de largo, estambres internos con filamentos filiformes, 4.1-8.0 mm de largo, anteras 10-12 mm de largo, apéndices del conectivo 1-3 mm de largo; apéndices carpelares triangulares, 1.3-2.9 mm de largo. Fruto subesferoide, cóncavo en la parte superior, rayos estigmáticos y apéndices carpelares persistentes, 3.9-4.7 cm de diámetro; semillas elipsoides, largo 1.1-1.4 mm, ancho ca. 0.8 mm, cubierta seminal externa de color verde olivo pilosa, tricomas arreglados en hileras, cubierta interna pardo oscura, areolada, rafe poco conspícuo, región micropilar convexa.

Ejemplares examinados:

Yucatán: 12 km NW de Hunucmá, *Cabrera 10417* (MEXU); Cenote de Dzibilchaltún, *Calzada et al. 6529* (XAL,YUC); Cenote Uitzil, *Gaumer 428* (MO); Cenote de Dzibilchaltún, *Lot 2577* (MEXU); 8 km E de Celestún, *Lot 2608* (MEXU); Cenote de Dzibilchaltún, *Ordóñez 36* (XAL,YUC); Cenote de Chichén Itzá, *Steere 2513* (MEXU); 10 km S de Catmis, *White 273* (NO).

Campeche: 15 km S de Sabancuy, *Cabrera 2279* (MEXU); 8 km SE de Sabancuy, *Cabrera 14467* (MEXU,XAL); Tintal cerca de Matamoros, *Calzada et al. 6812* (XAL,YUC); Río Candelaria, *Chan 1130* (XAL,YUC); Laguna cerca de Sabancuy, *Chan 1185* (XAL,YUC); Laguna de Atasta, *Chan & Burgos 1229* (XAL,YUC); Laguna de Noh, *Chan & Ucan 962* (XAL,YUC); Río Candelaria, *Chater et al. 115* (MEXU); Carr. Escárcega-Candelaria, *Hernández et al. ES-332* (MEXU); Río Candelaria, *Lot & Novelo 866* (MEXU); 20 km SW de Champotón, *Martínez et al. 3035* (MEXU); Palizada, *Matuda 3877* (MEXU); Escárcega, *Matuda 37479* (MEXU); Carr. Sabancuy-Escárcega, *Menéndez 484* (MEXU,MO,XAL); Carr. Sabancuy-Escárcega, *Menéndez 494* (MEXU,XAL); Laguna de Noh, *Menéndez 497* (MEXU,MO,XAL); Río Mamantel (El Pital), *Menéndez 521* (MEXU,XAL); Chiná, *Novelo & Zetina 690* (MEXU); km 90 carr. Champotón-Isla Aguada, *Ortiz 671* (XAL,YUC); Playa Azul, entre Champotón y Sabancuy, *Rico-Gray 145* (XAL,YUC); Camino Tancuché-El Remate, *Rico-Gray 237* (XAL,YUC); Camino Tancuché-El Remate, *Rico-Gray & Burgos 487* (XAL,YUC); Carr. Chekubul-Cd. del Carmen, *Sereno s/n* (Nov. 10, 1976) (ENCB); Silvituk, Laguna de Noh, *Ucan & Chan 1666* (XAL,YUC).

Quintana Roo: Laguna en Cobá, *Barrera et al. 275* (MEXU); Laguna en Cobá, *Barrera et al. 296* (MEXU,MO); Bacalar, *Boege 3204* (MEXU); El Estero, cerca de La Unión, *Calzada et al. 7114* (NO,XAL,YUC); El Palmar 33 km SW de Chetumal, *Chater et al. 84* (MEXU); San José de la Montaña, *Chater et al. 95* (MEXU); Canal Muyil en Chunyaxché, *Durán & Olmsted 435* (CIQRO,MEXU,XAL); km 4.5 camino Vigía Chico-Carrillo Puerto (Sian Ka' an), *Gutiérrez 137* (CIQRO,XAL); SW de Bacalar, *Lot & Novelo 779* (MEXU); Laguna de Chunyaxché, *Lot & Novelo 840* (MEXU); Laguna en Cobá, *Narváez & Rico-Gray 281* (XAL,YUC); San José de la Montaña, *Novelo 267* (MEXU); Laguna San Antonio, *Novelo 278* (MEXU); Bacalar, *Novelo 309* (MEXU); Laguna Pitoro, carr. Bacalar-Polyuc, *Novelo 326* (MEXU); S de Isla de Cozumel, *Rico-Gray 254* (NO,XAL,YUC); 14 km al NE-E de Cobá, *Téllez 1409* (CIQRO,MEXU); Río Hondo, *Téllez 2370* (MEXU); Crucero del Ramonal y Vigía Chico en Sian Ka'an, *Villanueva 332* (CIQRO,MEXU,XAL).

Nymphaea jamesoniana Planchon, *Fl. Serres. Jard. Eur.* 8:120. 1852.

Hierbas enraizadas con hojas flotantes, rizoma ovoide a cilíndrico, largo 3 cm, diámetro 1.7 cm. Hojas ampliamente elípticas a ovadas, largo 11.5-12.9

cm, ancho 8.8-10.1 cm, con el haz y envés verde, ocasionalmente con diminutas manchas oscuras, margen entero, ápice obtuso, base cordada, lóbulos obtusos, 5.8-6.5 cm de largo, nervación reticulada, nervaduras principales 15-16, nervaduras secundarias formando una red aracnoide muy evidente; pecíolo robusto, glabro, 1.6-2.4 mm de diámetro. Flores flotantes, amarillo-pálidas a blancas, antesis nocturna, pedúnculo firme, 2.8-2.9 mm de diámetro; sépalos ampliamente lanceolados a ovados, verdes, superficie externa con líneas oscuras, largo 4.9-5.8 cm, ancho 1.6-2.1 cm; pétalos muy ampliamente ovados, largo 3.8-4.4 cm, ancho ca. 2 cm, ápice obtuso; estambres externos con filamentos lanceolados, 1.7-1.9 cm de largo, anteras 9-11 mm, apéndices del conectivo acuminados, 0.4-0.5 mm de largo, estambres internos con filamentos lineares, 3-5 mm de largo, anteras 5-7 mm de largo, apéndices del conectivo obtusos, 0.2 mm de largo; carpelos subglobosos, apéndices carpelares color crema, ligeramente violáceos, subclavado-apiculados, 5.1-6.8 mm de largo, incurvados.

Los ejemplares revisados no tenían frutos o semillas.

Ejemplares examinados:

Campeche: Potrero La Muñeca cerca de Escárcega, *Bravo 1270* (MEXU); alrededores de Chiná, *Novelo & Zetina 698* (MEXU); Camino Tancuché-El Remate, *Rico-Gray 233* (XAL,YUC).

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LITERATURA CITADA

Adams, C.D. 1972. *Flowering Plants of Jamaica.* University of the West Indies. Mona, Jamaica.

Calderón de Rzedowski, G. 1979. Nymphaeaceae. *En*: J. Rzedowski & G.C. Rzedowski (eds.), *Flora Fanerogámica del Valle de México.* 1:193-196. C.E.C.S.A., México, D.F., México.

Correll, D.S. & H.B. Correll. 1975. Nymphaeaceae. *En*: *Aquatic and Wetland Plants of the Southwestern United States*, pp. 900-912. Stanford University Press, Stanford, California.

Duke, J.A. 1962. Nymphaeaceae. *En*: Flora of Panama, Part IV. Fascicle 5. Ann. Missouri Bot. Gard. 49:137-143.

Lot, A. 1991. Vegetación y flora vascular acuática del estado de Veracruz. Tesis doctoral, Facultad de Ciencias, U.N.A.M. México, D.F., México.

Mason, H.L. 1957. *A Flora of the Marshes of California.* University of California Press, Berkeley, California.

Müller, J. 1981. Fossil pollen records of extant angiosperms. Bot. Rev. 47:1-142.

Raven, P.H. & D.L. Axelrod. 1974. Angiosperm biogeography and past continental movements. Ann. Missouri Bot. Gard. 61:539-673.

Sosa, V., J.S. Flores, V. Rico-Gray, R. Lira, & J.J. Ortiz. 1985. Lista Florística y Sinonimia Maya. *En*: V. Sosa (ed.), *Etnoflora Yucatanense*, 1:1-225. INIREB, Xalapa, Veracruz, México.

Standley, P.C. & J.A. Steyermark. 1946. Nymphaeaceae. *En*: P.C. Standley & J.A. Steyermark (eds.), Flora of Guatemala. Fieldiana Botany 24(4):239-242.

Ward, B.D. 1977. *Nelumbo lutea*, the correct name for the American Lotus. Taxon 26:227-234.

Wood, C.E., Jr. 1959. The genera of Nymphaeaceae and Ceratophyllaceae in the Southeastern United States. J. Arnold Arbor. 40:90-112.

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MISCELLANEOUS NEW TAXA OF BROMELIACEAE (IX)

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ABSTRACT

Based on field and herbarium study, the following new taxa are described: **Guzmania kentii**, **G. rhonhofiana** forma **variegata**, and **G. zakii** from Ecuador; **Guzmania armeniaca** from Panamá, and **Pepinia neglecta** from Perú. In addition, *Pitcairnia beachiae* is transferred to the genus *Pepinia*, and *Pitcairnia pulchella* is reclassified as a variety of *P. nigra*. Miscellaneous New Taxa of Bromeliaceae (VIII) was published in Selbyana 12:68-90. 1991.

KEY WORDS: Bromeliaceae, Costa Rica, Ecuador, *Guzmania*, Panamá, Perú, *Pepinia*, *Pitcairnia*, systematics

COSTA RICA

The re-establishment of the genus *Pepinia* Brongn. *ex* André requires the following new combination:

Pepinia beachiae (Utley & Burt-Utley) Luther, *comb. nov.* BASIONYM: *Pitcairnia beachiae* Utley & Burt-Utley, Ann. Missouri Bot. Gard. 78:266-7. 1991.

ECUADOR

Guzmania kentii Luther, *sp. nov.* (Figure 1). TYPE: ECUADOR. Imbabura, mountains east of Lita, 1500-1700 m, Jan. 1987, *J. Kent legit.* Flowered in cultivation, Dec 1990, *H.E. Luther s.n.* (HOLOTYPE: SEL).

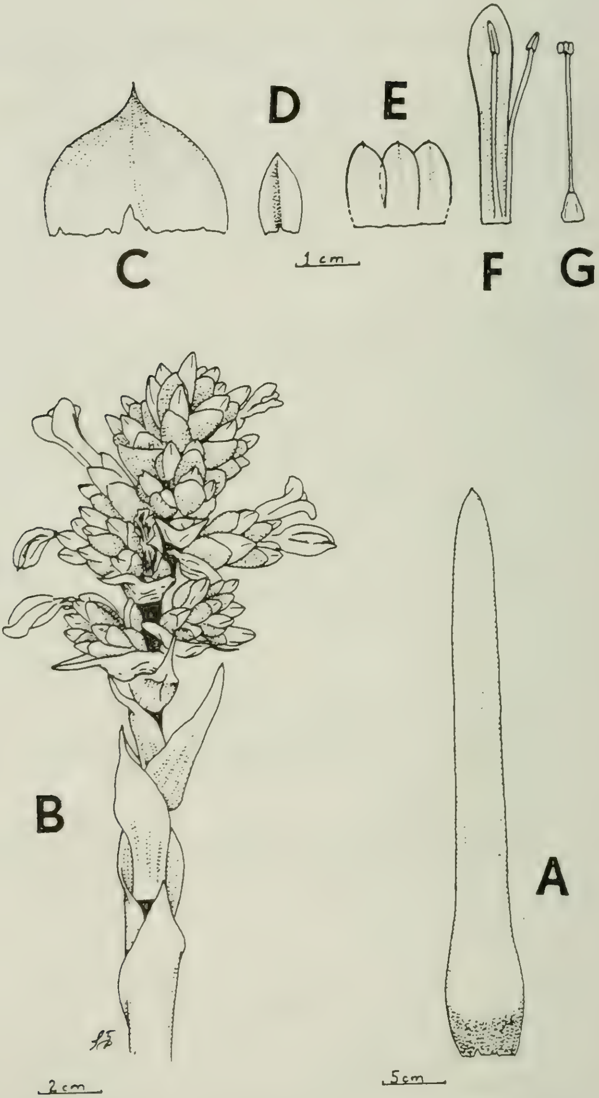

Figure 1. *Guzmania kentii.* A. leaf. B. inflorescence. C. primary bract. D. floral bract. E. calyx. F. petal with stamens. G. pistil.

A *Guzmania goudotiana* Mez, cui affinis, inflorescentia ramosissima, sepalis bracteis excedibus, petalis longioribus differt.

Plant flowering to 0.5 m tall. Leaves densely rosulate, laxly spreading, 75-90 cm long, thin coriaceous, inconspicuously appressed punctate lepidote especially abaxially. Leaf sheaths elliptic, 8-10 × 5-7 cm, brown punctate lepidote, dark castaneous abaxially. Leaf blades ligulate, broadly acute and apiculate, 20-40 mm wide, light green. Scape erect, 30-40 cm × 5-6 mm, glabrous, light orange-rose. Scape bracts erect, imbricate, the lower subfoliaceous and green or green with orange-rose striations, the upper elliptic, acute to attenuate, green striated and suffused with orange-rose, exceeding but exposing the internodes of the scape. Inflorescence densely bipinnate, 6-10 × 4-8 cm with 8-10 polystichously arranged branches. Primary bracts elliptic to broadly ovate, acute and apiculate, shorter than the branches, light yellow-green with rose striations or solid orange-rose. Branches subsessile, spreading at 45-90° from the axis, 2-4 × 1-2 cm, 6-15-flowered. Floral bracts elliptic, acute, 12-15 mm long, thin coriaceous, nerved, carinate, orange-rose. Flowers with a 1-3 mm long stout pedicel, erect to slightly spreading at anthesis, opening at approximately midnight and closing soon after dawn. Sepals elliptic, acute, 14-15 mm long, thin coriaceous, nerved, carinate, connate 3-5 mm, pale yellow. Corolla with spreading lobes. Petals oblanceolate, obtuse, 30-36 mm long, closely agglutinates for ca. 20 mm, white.

This colorful new species seems to be closely related to the Colombian *Guzmania goudotiana*, but is distinguished by its more richly branched inflorescence, sepals that all exceed the floral bracts and much longer petals. The brilliant coloration of the inflorescence seems at odds with its late nocturnal anthesis.

The specific name honors Mr. Jeffrey Kent, president of Kent's Bromeliad Nursery, Vista, California, who has amassed an outstanding collection of guzmanias.

Guzmania rhonhofiana Harms forma **variegata** Luther, *forma nov.* TYPE: ECUADOR. Pichincha, grounds of Hotel Tinalandia between Santo Domingo and Allurquin, 700-800 m, 1 Dec 1991, *B. Girko E91D-021* (HOLOTYPE: SEL).

A typo *G. rhonhofianae* Harms foliis flavovirentibus striatis differt.

Yellow striated plants of *Guzmania rhonhofiana* are rather common in relict patches of forest near Santo Domingo de los Colorados (pers. obs.), and are reported to be especially conspicuous on the grounds of the Hotel Tinlandia.

Guzmania zakii Luther, *sp. nov.* (Figure 2). TYPE: ECUADOR. Pastaza, Carretera de Petro-Canada, 115 km S of Coca, 4 km S of Río Tigüino, 320 m, 22-28 Feb 1989, *Vlastimil Zak 4017* (HOLOTYPE: MO).

> A *G. alstonii* L.B. Smith, cui affinis, inflorescentia digitata minoreque et petalis longioribus differt; a *G. acuminata* L.B. Smith, cui similis, laminis foliorum perlatioibus et bracteis florigeris majoribus differt.

Plant flowering 0.6-0.9 m tall. Leaves densely rosulate, spreading, 20 or more in number, 75-100 cm long. Leaf sheaths elliptic, 10-15 × 5-8 cm, castaneous and densely brown punctate lepidote especially abaxially. Leaf blades ligulate, acute to acuminate, 3-4 cm wide, appressed punctate lepidote especially abaxially, dark green, paler toward the margins when dried. Scape erect, 50-75 cm × 4-5 mm, glabrous. Scape bracts erect, densely imbricate, much exceeding the internodes, the lowest subfoliaceous, the upper elliptic, acute to acuminate, lustrous and castaneous toward the base abaxially, green. Inflorescence digitate broadly ovoid, 6-8 × 6-9 cm, with 3 to 5 branches. Primary bracts broadly elliptic, to ovate, acuminate, nearly equaling to exceeding the branches, lustrous and castaneous toward the base abaxially, green drying stramineous. Branches subsessile, spreading at ca. 45° from the main axis, ovoid, 2-5 × 2-4 cm, 10 to 20-flowered. Floral bracts broadly elliptic, ovate or obovate, 20-24 × 12-20 mm, thin, coriaceous with membranous margins, lustrous, green drying stramineous. Flowers with a 2-3 mm long stout pedicel, erect to slightly spreading, probably opening at night. Sepals elliptic, acute, 15-18 mm long, the adaxial pair basally carinate, connate 2-4 mm. Corolla widely spreading. Petals spatulate, obtuse, 25 mm long, ca. 1/3 connate, white, stamens and style conspicuously exserted at anthesis due to the spreading of the petals.

Paratypes: ECUADOR. Sucumbios, Reserva Faunistica Cuyabeno, Laguna Grande, 265 m, 11 March 1990, *H. Balsley et al. 97204* (AAU,QCA); Pastaza, Carretera de Petro-Canada, 115 km S of Coca, 6 km S of the Río Tigüino, 320 m, 1-9 April 1989, *V. Zak & D. Rubio 4305* (MO).

Guzmania zakii may be distinguished from the related *G. alstonii* by its short, densely digitate inflorescence and larger corolla. It occurs as an epiphyte in lowland Amazonian forest, a habitat that is generally poor in *Guzmania* species. It is interesting to note that most of the few species of *Guzmania* distributed in Amazonia, including *G. zakii*, are night flowering and presumably bat-pollinated.

The epithet honors Vlastimil Zak of Quito, Ecuador, who first collected this new species during a botanical inventory sponsored by Petro-Canada & Gas Inc.

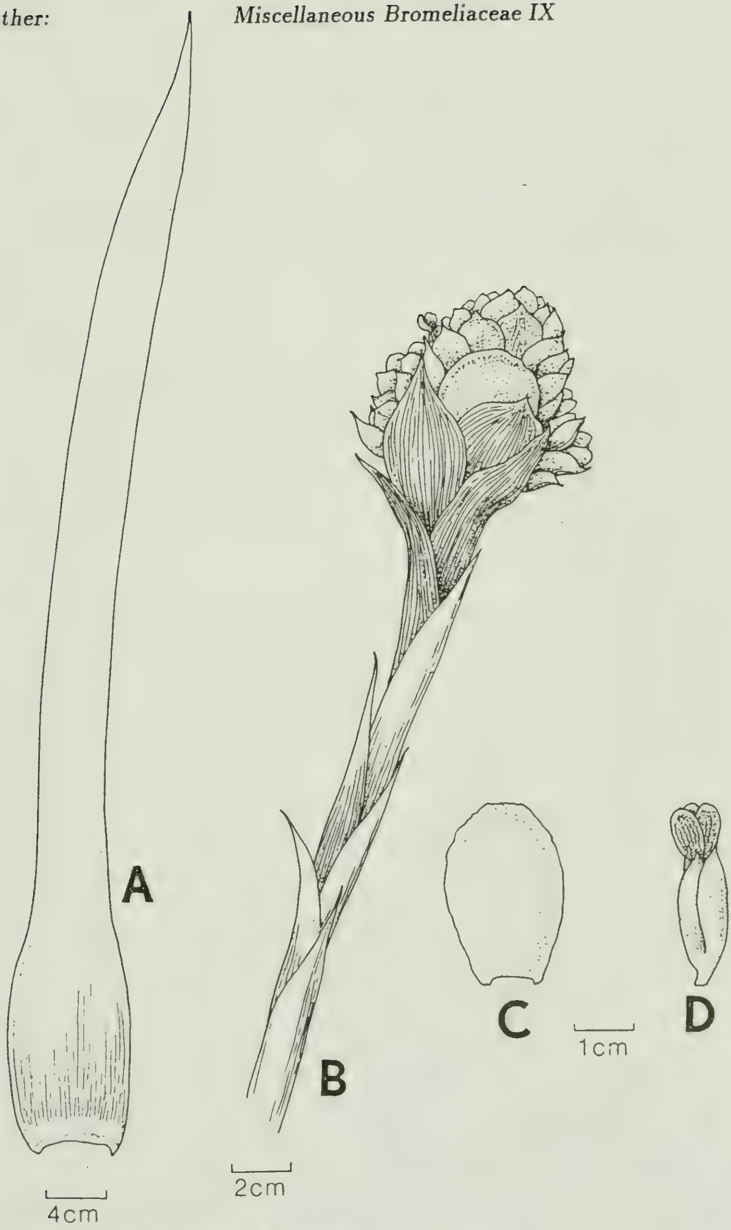

Figure 2. *Guzmania zakii.* A. leaf. B. inflorescence. C. floral bract. D. flower.

Pitcairnia nigra (Carr.) André var. **pulchella** (Mez) Luther, *comb. et stat. nov.* BASIONYM: *Pitcairnia pulchella* Mez *in* C. DeCandolle, *Monogr. Phan.* 9:459. 1896.

This taxon seems at best a smaller, more delicate morph of *Pitcairnia nigra*, a species with a distribution on both slopes of the Andes in Ecuador and adjacent Colombia.

PANAMA

Guzmania armeniaca Luther, *sp. nov.* (Figure 3). TYPE: PANAMA. Panamá, Cero Jefe, 600-800 m, Jan 1985 *J. Kent legit.* Flowered in cultivation 5 Feb 1992, *H.E. Luther s.n.* (HOLOTYPE: SEL).

> A *G. filiorum* L.B. Smith, cui affinis, inflorescencia brevioribus latioribusque, bracteis florigeris armeniacis non viridibus differt; A *G. desautelsii* L.B. Smith & R.W. Read, cui similis, bracteis florigeris et sepalis longioribus differt.

Plant flowering to 23 cm tall, clustering. Leaves densely rosulate, spreading, 25-32 cm long, thin coriaceous, light green. Leaf sheaths elliptic, 7-10 × 3-4 cm, castaneous and brown ferruginous lepidote especially adaxially, red-purple striate or purple-suffused abaxially. Leaf blades ligulate, broadly acute and apiculate, 20-23 mm wide, punctate lepidote especially abaxially. Scape erect, 10-12 cm × 2-3 mm, much shorter than the leaves. Scape bracts erect, imbricate, the leaves subfoliaceous, green; the upper narrowly elliptic, acute to attenuate, green to orange. Inflorescence strobilate, 5-6 × 4-5 cm, densely polystichously 35-40-flowered. Floral bracts elliptic to obovate, acute to rounded and apiculate, 25-27 × 14-17 mm, thin coriaceous, lustrous, light orange with inconspicuous darker striations. Flowers with a stout 1-2 mm pedicel, erect to slightly spreading, opening during the morning. Sepals elliptic, broadly acute, 15-17 mm long, connate 3-5 mm, thin coriaceous, the adaxial pair carinate, pale yellow. Corolla erect, tubular. Petals ligulate, obtuse, somewhat cucullate, 23-28 mm long, closely agglutinated for 10-12 mm, pale yellow to cream, very slightly exserted beyond the floral bracts. Stamens and pistil included. Some of the anthers adhering to the stigma at anthesis.

This attractive new species seems most closely related to *Guzmania filiorum*, also from Panamá. It is distinct by having a shorter but broader many-flowered inflorescence with light orange (not light green) floral bracts, and yellow or cream (not white) petals. It is also similar and probably related to *G. desautelsii* from Costa Rica and Panamá, but may be distinguished by shorter floral bracts (25-27 vs. 40 mm) and sepals (15-17 vs. 20 mm), as well as light orange (not dark orange to purple-red) bracts.

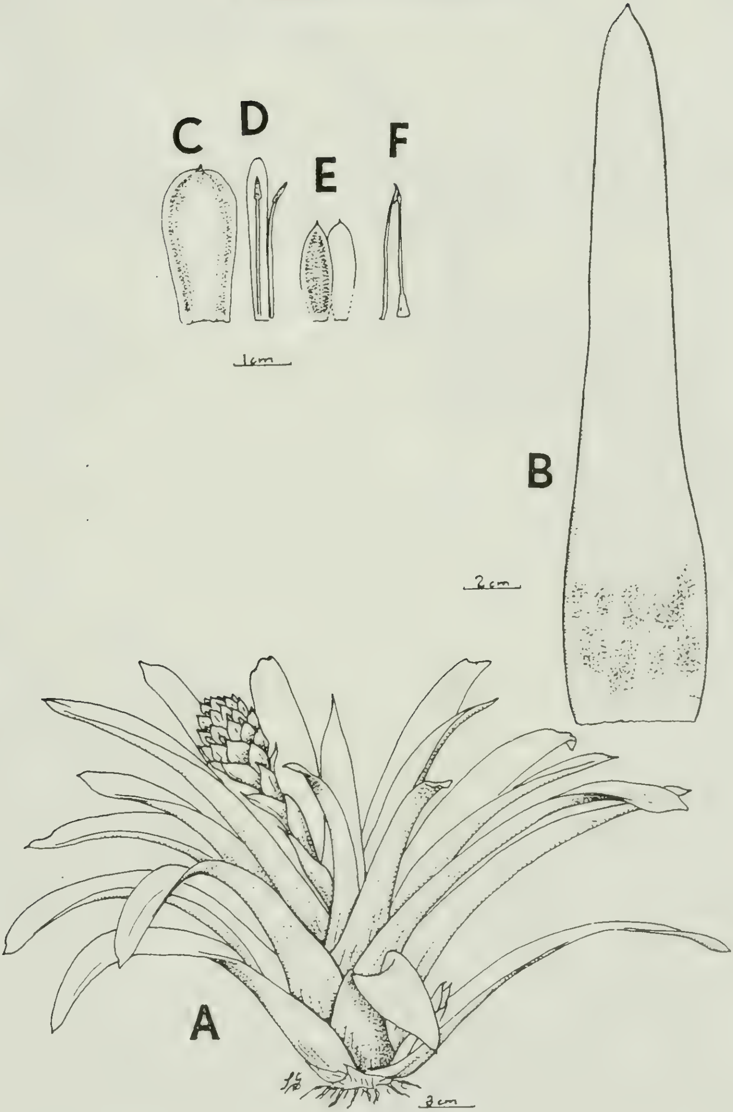

Figure 3. *Guzmania armeniaca.* A. habit. B. leaf, adaxial surface. C. floral bract. D. petal with two stamens. E. sepals. F. pistil with anther adherent to stigma.

PERU

Pepinia neglecta Luther, *sp. nov.* (Figure 4). TYPE: PERU. San Martín, roadside between Tarapoto and Yurimaguas, 1000 m, July 1981, *J. Halton & L. Besse legit.* Flowered in cultivation (SEL 81-2007) 5 Feb 1992, *H.E. Luther s.n.* (HOLOTYPE: SEL; Isotypes: USM,US).

> A *P. quesnelioides* (L.B. Smith) Varadarajan & Gilmartin, cui similis, bracteis florigeris coriaceis non herbaceis fibrosisque, petalis majoribus differt; a *P. alexanderi* Luther, cui similis affinisque, inflorescentiae latioribus erectisque, sepalis petalisque longioribus differt.

Plant flowering to over 1 m tall, clustering, somewhat caulescent. Leaves essentially monomorphic, laxly rosulate, spreading, pseudopetiolate, to 1.65 m long. Leaf sheaths elliptic to ovate, 2-5 × 2-3 cm, nerved, castaneous, brown lepidote especially abaxially. Leaf blades with a 40-75 × 1-2 cm, channeled, laxly serrate pseudopetiole; the upper portion of the blade very narrowly elliptic, attenuate, 4-8 cm wide, channeled, somewhat plicate, subdensely antrorse serrate with 0.5-1.0 mm dark spines, bright green, somewhat paler abaxially. Scape erect to decurved, 15-30 cm × 8-12 mm, reddish. Scape bracts erect, imbricate, elliptic to ovate, acute to attenuate, thin coriaceous, exceeding the internodes, tan or reddish. Inflorescence erect, simple, cylindrical, 15-27 × 4-6 cm, densely polystichous-flowered. Floral bracts erect, densely imbricate, broadly elliptic to ovate, obtuse to apiculate, 30-43 × 20-28 mm, thin coriaceous, even to somewhat nerved, glabrous, red. Flowers with a stout 2-5 mm pedicel, erect. Sepals free, triangular, obtuse or retuse, 27-31 mm long, thin coriaceous, slightly nerved, white to pale green. Corolla strongly zygomorphic, arcuate. Petals oblanceolate, obtuse, 75-85 mm long, each with a single and variable 10-15 mm long, emarginate appendage at the base, bright red with a white margin.

Paratype: PERU. Type locality, clone of the holotype, 15 Sept 1983, *H.E. Luther s.n.* (SEL); 4 Feb 1987, *T. Walters 1996* (SEL).

This new species is related to and resembles *Pepinia alexanderi* from southeastern Ecuador but may be distinguished by its broader inflorescence which is held erect, and by longer sepals (27-31 mm vs. 23 mm) and petals (75-85 mm vs. 70 mm). Also, the floral bracts do not become necrotic and black immediately after anthesis.

The similar *Pepinia quesnelioides* from Amazonian Colombia and Perú may be easily separated by its fugaceous, quickly tattered floral bracts and much shorter (50 mm vs. 75-85 mm long) petals.

The type and only known collection of *Pepinia neglecta* has flowered several times in the Display Greenhouse of the Marie Selby Botanical Gardens.

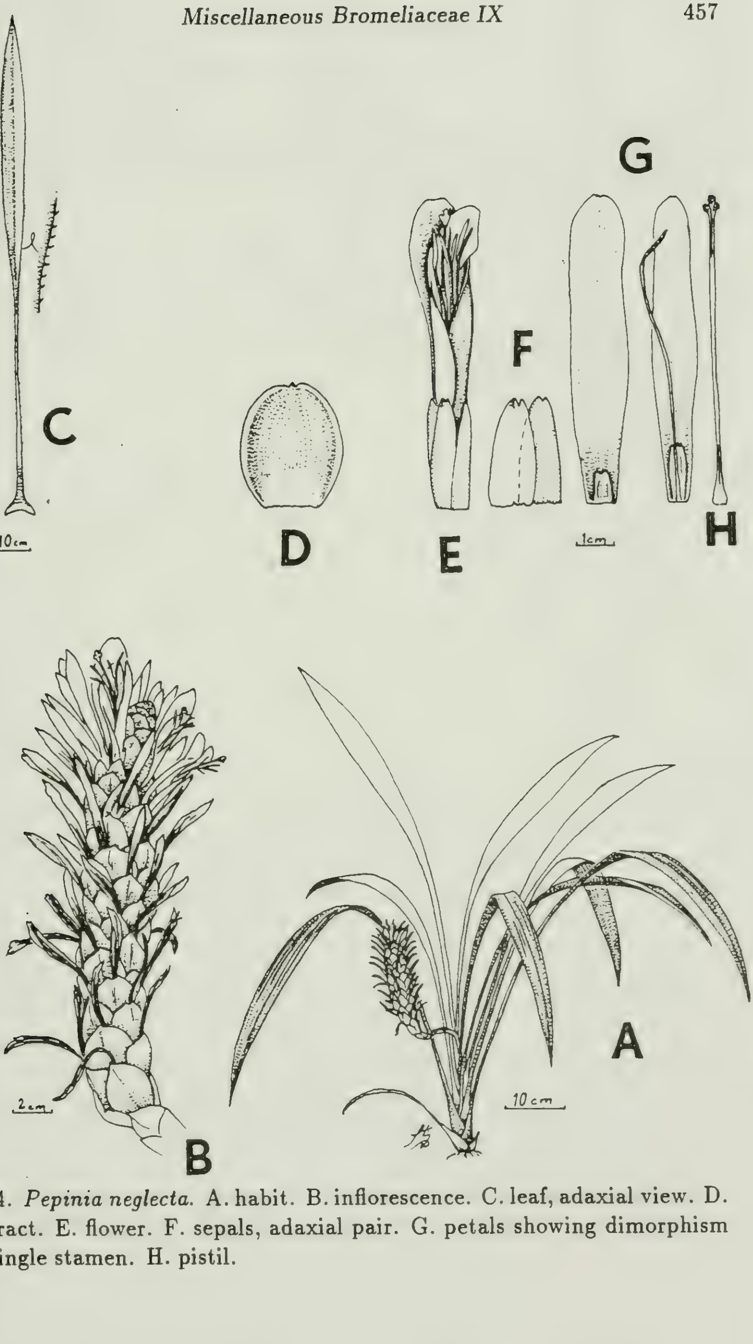

Figure 4. *Pepinia neglecta.* A. habit. B. inflorescence. C. leaf, adaxial view. D. floral bract. E. flower. F. sepals, adaxial pair. G. petals showing dimorphism and a single stamen. H. pistil.

Although it was collected over a decade ago, it inexplicably escaped my critical attention until very recently. It is a spectacular, albeit large, ornamental with considerable horticultural appeal.

ACKNOWLEDGMENTS

I thank Dr. Meg Lowman and Dr. Gregory Brown for their thoughtful reviews of the manuscript.

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CHROMOSOME NUMBERS FOR SOME NORTH AMERICAN *CRYPTANTHA* (BORAGINACEAE)

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ABSTRACT

Gametic chromosome numbers are presented for eleven taxa of North American *Cryptantha*. A haploid number of n=9 (*C. pusilla*) is reported for the first time in the subgenus *Krynitzkia*. The common chromosome number of n=12 was found for *C. bakeri*, *C. barbigera*, *C. flava*, *C. fulvocanescens*, *C. oblata*, *C. paysonii*, *C. pustulosa*, and three variations of *C. cinerea*. Eight of these counts are new, three support previous counts, and two indicate possible intraspecific polyploidy.

KEY WORDS: *Cryptantha*, Boraginaceae, chromosome number

The chromosome numbers reported in this paper result from an investigation into the potential benefits of cytological research on the large and complex genus *Cryptantha* in North America. The plants sampled in this study represent nine perennial taxa in the subgenus *Oreocarya* and two annual species in the subgenus *Krynitzkia*. The chromosome numbers obtained in this sample show almost no variation from a common haploid number of n=12. The exception is the n=9 number obtained for *C. pusilla*. The numbers obtained for *C. barbigera* and *C. oblata* do not agree with previous counts and are either the result of intraspecific polyploidy or the inherent difficulty of obtaining accurate counts for this genus.

In this study, floral buds were fixed in alcohol-acetic acid (3:1) solution, stained in Snow's (1963) hydrochloric acid-carmine stain, squashed by standard technique and observed with phase contrast optics. *Cryptantha* chromosomes are exceedingly difficult to observe because they are small (<10 microns) and have a tendency to stick together during most stages of meiosis. The chromosome numbers reported here are from meiocytes in diakinesis, which I found to be the only stage to produce reliable counts. All specimen vouchers are deposited at UNM and the collection numbers cited are mine. Synonymy is provided for the *C. cinerea* variants since the synonyms provide more diagnostic descriptions of the plants sampled than the current taxonomic treatment.

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RESULTS

CRYPTANTHA SUBGENUS *OREOCARYA*

Cryptantha bakeri (E. Greene) Payson. $n=12$. NM, San Juan Co., 5 km W of La Plata on Hwy 173, 17 May 1983, *1080*. This is the same count reported by Higgins (1971).

Cryptantha cinerea (E. Greene) Cronq. var. *abortiva* (E. Greene) Cronq. [= *C. jamesii* (Torr.) Payson var. *disticha* (Eastw.) Payson]. $n=12$. NM, Taos Co., 8 km N of Rinconada, 2 June 1984, *1239*.

Cryptantha cinerea (E. Greene) Cronq. var. *abortiva* (E. Greene) Cronq. [= *C. jamesii* (Torr.) Payson var. *setosa* (Jones) Johnst. *ex* Tidestr.]. $n=12$. NM, Socorro Co., Chupadera Mesa, 16 km ENE of Bingham, 7 May 1983, *1058*.

Cryptantha cinerea (E. Greene) Cronq. var. *jamesii* Cronq. [= *C. jamesii* (Torr.) Payson var. *multicaulis* (Torr.) Payson]. $n=12$. NM, San Juan Co., 5 km SSW of Bloomfield and 1 km W of Hwy 44, 17 May 1983, *1073*.

Cryptantha flava (A. Nels.) Payson. $n=12$. NM, Sandoval Co., 2 km SE of Bernalillo on I-25, 31 March 1984, *1154*. This is the same count reported by Higgins (1971).

Cryptantha fulvocanescens (S. Wats.) Payson. $n=12$. NM, Sandoval Co., 3 km NE of Algodones on I-25, 12 April 1984, *1157*; San Juan Co., 4 km S of Farmington on Hwy 371, 15 May 1984, *1199*; Rio Arriba Co., 3 km NW of Abiquiu and 0.5 km N of the Chama River, 20 May 1984, *1228*. This is the same count reported by Higgins (1971).

Cryptantha oblata (Jones) Payson. $n=12$. NM, Doña Ana Co., Tortugas Mt., 5.5 km E of Las Cruces, 18 March 1983, *994*. Another plant from this same location was determined to be $n=6$ (at telophase I) by Ward (1983), however, the specimen was misidentified and published as *C. jamesii* var. *multicaulis*. This chromosome number is anomalous for perennial *Cryptantha* and may be a misinterpretation of the meiotic stage. If Ward's count is accurate, my count of $n=12$ would indicate intrapopulational polyploidy. This population should receive additional study.

Cryptantha paysonii (Macbr.) Johnst. $n=12$. NM, Socorro Co., 12 km ENE of Socorro and 2 km E of Cerros de Amado, 7 May 1983, *1052*.

Cryptantha pustulosa (Rydb.) Payson. $n=12$. NM, Sandoval Co., White Mesa, 7 km W of San Ysidro, 5 May 1984, *1182*.

CRYPTANTHA, SUBGENUS *KRYNITZKIA*

Cryptantha barbigera (A. Gray) E. Greene. $n=12$. NM, Luna Co., 8 km SE of Deming on the NE slope of the Florida Mts., 17 March 1983, *985*. A previous metaphase count of $n=6$ has been reported for this species by Ward (1983). These different counts indicate intraspecific polyploidy which should be verified with additional counts from meiocytes in diakinesis.

Cryptantha pusilla (A. Gray) E. Greene. $n=9$. NM, Luna Co., 29 km SSE of Deming on the S slope of the Florida Mts., 18 March 1983, *992*; Sierra Co., 4 km NE of Caballo Dam on the W slope of the Caballo Mts., 23 April 1983, *1033*. Meiosis appears normal and the pollen of both collections is 100% viable, as determined by cotton-blue staining.

DISCUSSION

The results of this and other studies (Higgins 1971; Mathew & Raven 1962; Ward 1983) show $n=12$ to be a common haploid number for the North American members of the genus *Cryptantha*. Mathew & Raven (1962) discovered additional ploidy levels while separating *C. similis* Mathew & Raven ($n=6$) from *C. circumscissa* (Hook. & Arn.) Johnst. ($n=12$, 18). They interpreted these numbers to be diploid, tetraploid, and hexaploid respectively, and assigned a basic chromosome number of $x=6$ to the genus.

The haploid number of $n=9$ reported here for the annual *Cryptantha pusilla* is the first report of this chromosome number for the subgenus *Krynitzkia*. A similar haploid number of $n=9$ has been reported by Taylor & Brockman (1966) for the perennial *C. celosioides* (Eastw.) Payson (reported as *C. macounii* Eastw.) in the subgenus *Oreocarya*. These are significant departures from Mathew & Raven's basic number of $x=6$. At $2n=18$ they could be triploids, but this explanation seems unlikely since natural triploids are rare and usually infertile in sexually reproducing plants (Grant 1981). Triploids can be highly fertile when apomictic. However, I can find no reference of agamospermy in the Boraginaceae. Agamospermous plants also usually have a perennial habit (Grant 1981), which is not the case with *C. pusilla.* Additional evidence against triploidy is the fact that meiosis appears normal (9 bivalents) in both of the above cases.

It is also possible that the chromosome number of n=9 for *Cryptantha* is aneuploid rather than triploid in origin. Numerical deviations in *Cryptantha* have been reported for the Chilean species of this amphitropical genus. These annual, South American species have diploid numbers of 2n=14, 20, 62, 64, and 124 (Grau 1983), which defy an attempt to assign a basic chromosome number to the group. The problem with the aneuploidy hypothesis is there are no known intermediate aneuploids between n=6, 9, 12, and 18 in the North American *Cryptantha.* It seems unusual that the two species exhibiting ploidy deviations belong to different subgenera, but both incur a primary repatterning (dysploidy) or polyploid drop (aneuploidy) involving three chromosomes.

There are other genera in the Eritrichieae tribe of the Boraginaceae that also have species with haploid numbers of n=6, 9, and 12 (Britton 1951). Britton's small sample of *Myosotis* resulted in basic chromosome numbers of x=9 and 12 for that genus. He speculates that "These might be further reduced to a common basic number of 3, although no species with that number is known either in the genus or the family." Such an extremely low chromosome number is also not known from any related plant families and could not be considered basic. Hopefully, additional investigators with the necessary optics and patience will continue to study this unusual series of chromosome numbers in the North American *Cryptantha.*

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LITERATURE CITED

Britton, D.M. 1951. Cytogenetic studies on the Boraginaceae. Brittonia 7:233-266.

Grant, V. 1981. *Plant Speciation*, 2nd ed. Columbia University Press, New York, New York.

Grau, J. 1983. Life form, reproductive biology and distribution of the Californian/Chilean genus *Cryptantha*. *In*: K. Kubitzski (ed.), *Dispersal and Distribution*. Sonderbeih. Naturwiss. Verh. Hamburg 7:231-240.

Higgins, L.C. 1971. A revision of *Cryptantha* subgenus *Oreocarya*. BYU Sci. Bull. 13(4):1-63.

Mathew, K. & P.H. Raven. 1962. A new species of *Cryptantha* (section *Circumscissae*) from California and two recombinations (section *Circumscissae* and section *Angustifoliae*). Madroño 16:168-171.

Snow, R. 1963. Alcoholic hydrochloric acid-carmine as a stain for chromosomes in squash preparations. Stain Technol. 38:9-13.

Taylor, R.L. & R.P. Brockman. 1966. Chromosome numbers for some western Canadian plants. Canad. Jour. Bot. 44:1093.

Ward, D.E. 1983. Chromosome counts for New Mexico and Southern Colorado. Phytologia 54:302-308.

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TWO NEW SPECIES OF *LAMOUROUXIA* (SCROPHULARIACEAE) FROM MEXICO

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ABSTRACT

Two new species of *Lamourouxia* are described from México: **L. paneroi** B.L. Turner, from Cerro Grande (Quiexobra), Oaxaca and **L. zimapana** B.L. Turner, from near Zimapan, Hidalgo. Both are closely related to *L. pringlei* B.L. Robins. & Greenm., but each differs by a number of characters, most notably vestiture. A key to the several taxa is devised.

KEY WORDS: Scrophulariaceae, *Lamourouxia*, México

Identification of miscellaneous species from México has brought to the fore the following new species of *Lamourouxia*. This was made easier by the excellent treatment accorded the genus by Ernst (1972). Since both of the new taxa are closely related to *L. pringlei*, I have provided the following key to distinguish between them.

1. Vestiture of calyx and stem glandular-puberulous; southern Puebla and adjacent northern Oaxaca. .... *L. pringlei*

1. Vestiture of calyx and stem short-pilosulous, not at all glandular; Hidalgo and southcentral Oaxaca. ....(2)

    2. Leaves thick, elliptic, mostly 1 cm long or less, the margins entire or crenulate; southcentral Oaxaca. ....*L. paneroi*

    2. Leaves thin, oblanceolate, mostly 1.5-2.5 cm long, the margins dentate; Hidalgo. .... *L. zimapana*

Lamourouxia paneroi B.L. Turner, *sp. nov.* TYPE: MEXICO. Oaxaca: 7 km E of the turnoff to Santo Domingo Ozolotepec on road to San Juan Ozolotepec. Rocky exposed area near summit of Cerro Grande (Quiexobra), dominated by Ericaceae shrubs, *Nolina* and pines, occasional, 3700 m, 11 Dec 1992, *José L. Panero 3078*, with Youngdong Kim, & Elizabeth Manrique (HOLOTYPE: MEXU; Isotypes: TEX!, to be distributed).

Lamourouxiae pringlei B.L. Robins. & Greenm. similis sed floribus in pedicellis longioribus et vestimento caulium ac calycum dense brevi-pilosulo (vs. glandulosi-pilosulo) differt.

Compact shrubs to 1.5 m high. Stems terete, purplish, densely white-pilosulous, the vestiture ca. 0.25 mm high. Leaves short and numerous, reflexed or spreading, thick, longer than the internodes, mostly 7-10 mm long, 2-3 mm wide; petioles 0.5-1.0 mm long; blades narrowly elliptic to elliptic-oblanceolate, pinnately nervate beneath, minutely hispidulous on both surfaces, the margins crenulate to nearly entire. Flowers 5-11, arranged in ascending secund or subsecund spikes at the apices of terminal or lateral branches, the ultimate pedicels 1-3 mm long. Fruiting calyx 9-10 mm long, 4-5 mm wide, minutely pilosulous throughout, eglandular, the lobes 2-4 mm long, acute, corollas 4-5 cm long, 1.0-1.2 cm wide (pressed), deep red, the upper lip 12-15 mm long, the lower lip 9-12 mm long, 3-lobed. Stamens 4, equal, exserted for 1-3 mm at maturity. Style hispidulous throughout, ca. as long as the corollas, the stigma capitate. Capsule (immature) globoid, glabrous.

Cerro Quiexobra is an isolated massif approximately 3800 m high located in southcentral Oaxaca at about 96°15′W × 16°13′N. It has only recently received botanical exploration, most notably by Dr. Andrew McDonald who collected numerous new taxa along its upper slopes (*e.g.*, Turner 1990).

Lamourouxia paneroi is clearly quite closely related to *L. pringlei* B.L. Robins. & Greenm. It differs from the latter in having shorter internodes, flowers on shorter pedicels, and eglandular vestiture, otherwise they are quite similar. So far as known *L. pringlei* is confined to southern Puebla and closely adjacent Oaxaca.

It is a pleasure to name this strikingly beautiful species for its principal collector, Dr. José Panero, postdoctoral botanist at TEX working in the DNA-oriented laboratory of Dr. R. Jansen.

Lamourouxia zimapana B.L. Turner, *sp. nov.* TYPE: MEXICO. Hidalgo: Barranca de San Vicente, near km 238 on highway between Zimapan and Jacala, rich soil on open limestone ledges and streamside thickets, 1800-2000 m, 9 Aug 1948, *H.E. Moore, Jr. 4429*, with C.E. Wood, Jr. (HOLOTYPE: TEX!; Isotype: BH!).

> *Lamourouxiae pringlei* B.L. Robins. & Greenm. similis sed caulibus, calycibus, ac pedicellis omnino brevi-pilosulis (vs. glandulosi-pubescentibus) et foliis tenuibus oblanceolatisque in paginis inferioribus pinnatinervibus (vs. crassis plerumque ellipticis vel elliptici-lanceolatisque nervatura vix vibili in paginis inferioribus) differt.

Rather weak-stemmed suffruticose herbs or shrublets to 80 cm high. Stems terete, reddish, densely short pilosulous with eglandular hairs. Leaves relatively thin, mostly 15-25 mm long, 5-7 mm wide; petioles mostly 0.5-2.0 mm long; blades elliptic-oblanceolate, 3-5 dentate on each side, or nearly entire, weakly pinnately nervate, moderately pubescent on both surfaces, the apices rounded. Flowers 10-20, erect, arranged in elongate leafy terminal racemes, the ultimate pedicels mostly 4-6 mm long. Calyx 10-12 mm long, 4-5 mm wide, pilosulous throughout, eglandular, the lobes 3-5 mm long, mostly with obtuse or rounded apices. Corollas "orange to red," ca. 4 cm long, 0.8-1.0 cm wide (pressed), the upper lip ca. 12 mm long, the lower ca. 10 mm long, 3-lobed. Stamens 4, subequal, scarcely exserted. Style ca. as long as the corolla, minutely hispidulous throughout. Capsule (immature) ovate, glabrous.

Ernst annotated type material of the present taxon as *Lamourouxia pringlei*. The latter taxon possesses a densely glandular-puberulous vestiture on the stems, pedicels and calyces, whilst *L. zimapana* has a strictly short-pilosulous vestiture. Ernst (1972) failed to include the latter character in his description of *L. pringlei*, although he notes that *L. pringlei* had two centers of distribution, a Hidalgo center and that of southern Puebla and adjacent Oaxaca, from whence the type. Ernst did call attention to several leaf characters which he thought might distinguish the Hidalgo populations from those of Oaxaca, namely thinner, more oblanceolate, leaves with margins mostly dentate (vs. thicker, more elliptical leaves with margins entire to merely crenate).

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LITERATURE CITED

Ernst, W.R. 1972. Floral morphology and systematics of *Lamourouxia* (Scrophulariaceae: Rhinanthoideae). Smithsonian Contr. Bot. 6:1-63.

Turner, B.L. 1990. A reevaluation of the genus *Alepidocline* (Asteraceae, Heliantheae, Galinsoginae) and description of a new species from Oaxaca, México. Phytologia 69:387-392.

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